REPORT

ON THE

TEMPERATURE OF CERTAIN

NERVOUS DISEASES:

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Report on the Temperature of Certain Nervous Diseases.

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If there is one thing more than another that gives character to the present era in medical history, it is the tendency to make use of collateral means in the investigation of disease. The stethoscope, sphygmograph, laryngoscope and thermometer, all tend to give a certainty to our examinations, unattainable in the earlier days of clinical study.

Thermometry is an outgrowth of the recent advances made in the departments of physics and physiology. True in the days of Hippocrates, the increase of bodily heat in disease was recognized, and Sanctorius, early in the 17th century, applied instruments for its measurement. During the succeeding hundred years, the thermometer almost passed from the memory of man, when its study was again revived through the labors of Boerhave. A few years later, DeHaen, a pupil of Boerhave, and the "first clinical teacher of Vienna and Germany," worked out many important facts connected with the subject, and gave them to the profession in his "Ratio Medendi."

Interesting as his investigations were, they fell still-born, and were compelled to await further advances in the kindred sciences of chemistry and physiology, before their full importance could be appreciated. Liebig, carrying out the in-

vestigations of the great Lavoisier as to the origin of animal heat, together with the brilliant discovery of Mayer, Helmholz, Joule and Grove, "of the correlation of the physical forces," and the mutual convertibility of the different forms of force without loss, placed thermometry on vantage ground, and since then its study has advanced with rapid strides.

In the present paper we propose to confine our discussion to one branch of the subject, i. e. the value of the thermometer in certain diseases of the nervous system.

The stability of the temperature in the healthy organism, furnishes the foundation upon which the superstructure of thermometry rests. It has been abundantly proven by different observers, that the ordinary surroundings of life and the ever-changing processes of nutrition and growth do not, in any notable degree, affect the diurnal variations peculiar to health. This makes the mensuration of bodily heat the surest test of health, and gives importance to those departures from the normal range found in disease.

This equability of temperature is most probably preserved through the influence of the nervous system. Brodie, supported by many of the ablest physiologists of his day, even attributed the origin of heat to the nervous system; and Chossat, afterwards, localized it in the sympathetic system.

Physiologists now generally agree that the healthy metamorphoses of the blood and tissues, and the temperature of the body, which is the result of such metamorphoses, are under the control of the nerves, and particularly of the sympathetic. So long as the integrity of the nervous system is unimpaired, like the governors to the engine, it is capable of so harmonizing the various forces of the body as to preserve under ordinary circumstances the normal standard of heat. Its function interfered with, either from some local trouble or blood-poison, a corresponding departure from the healthy range is registered by the thermometer.

The sympathetic is essentially the vaso-motor nerve, and consequently exercises a controlling influence over the phenomena of circulation, nutrition and heat. The experi-

ments of Bernard and Brown-Sequard, show that division of the cervical sympathetic causes, among other phenomena, dilatation of the arteries, and an increase of temperature on the operated side. Galvanizing the nerve produce a train of precisely opposite phenomena. Dr. William Ogle, reported a case to the Royal Medical Society, in which an abscess on the right side of the neck, had eaten through the cervical sympathetic. Among the symptoms noted, was the increased warmth of the ear, nostril and mouth of the right side when the patient was at rest. With violent exercise, the thermometrical conditions were inverted, the left side becoming the hotter. At the same time the left side of face, head and neck sweated profusely, while the right remained perfectly dry.

The vaso-motor nerves include not only fibres from the sympathetic, but also fibres from the cerebro-spinal system. The precise location of the vaso-motor center has not, as yet been positively ascertained. Lesions of the corpora striata and optic thalami affect the circulation on the side corresponding to the paralysis. Pathology shows that fibres of the sympathetic must extend higher up into the cerebrum, as many cases of lesion of this portion of the encephalon are on record, attended by phenomena similar to those produced by experiment.

Brown-Sequard, (*a*) sums up thus: "The effects of excitation of the vaso-motor nerves, consist essentially in a contraction of blood-vessels, which is followed by a diminution in the quantity of blood, in the temperature and in the activity of nutrition. The effects of interruption of continuity of the vaso-motor nerves (i. e. their paralysis) consist essentially in a paralytic dilatation of blood-vessels, which is followed by a greater afflux of blood, an increase of temperature, and a greater activity of nutrition." Dr. Robert T. Edes, (*b*) in his most excellent prize essay denies the proposition that increased nutritive action results from the increased blood supply in

(*a*) Physiology and Pathology of Nervous Centres, p. 205.

(*b*) The Physiology and Pathology of the Sympathetic or Ganglonic Nervous System.

vaso-motor paralysis, and considers the "more active movement of the blood as amply sufficient to account for the rise of temperature." Assistant Surgeon Alcock, (*a*) in a paper read before the Army Medico-Chirurgical Society, of Portsmouth, considers preternatural heat to be the result of three conditions, "suspension or exhaustion of the functions of the sympathetic, diminished nutrition and increased metamorphoses, but believes the second and third to be consequences of the first." While it is true in a large majority of cases, that a departure from healthy nutrition follows the withdrawal of the proper nerve stimulant, it is also true that lesions dependent upon irritation are often relieved by section of the nerve. Oftentimes bed sores heal readily in paralyzed parts. In a case of hemiplegia recently under observation the sloughs rapidly healed under the dry earth dressing.

Dr. Annandale in a recent number of the Edinburgh Medical Journal, reports the case of a paraplegic of twenty years standing, who fell from his bed and fractured both bones of the leg, about three inches above the ankle. The limb was put up in a starch bandage, and on removing the dressing ten weeks after the injury, the bones were found firmly united.

Although numerous cases, both pathological and experimental, can be cited, in which nutrition is not materially interfered with, difficult as it is to explain them, the fact still remains that affections of nutrition usually follow injury to nerves. Irritation probably plays a more important part in their production than paralysis of the vaso-motors.

The foregoing principles furnish the clue to the interpretation of the pathological conditions met with in injury to and disease of either the mixed nerves or the cerebro-spinal centres.

The extremes of temperature are met with in lesions of the nervous system. Concussion of brain and shock, giving the lowest and tetanus the highest temperatures on record.

(*a*) Medical Times and Gazette, February, 1869.

Brodie gives a case of forcible separation of the 5th and 6th cervical vertebræ, with laceration of the cord, in which the temperature between the scrotum and thigh was 111 deg. F. The man died in twenty-two hours after receiving the injury. Surgeon Manipold (*a*) reports two cases of fracture of spine, causing paralysis of lower limbs, in both of which the temperature was much reduced. In one there was fracture of the 12th dorsal vertebra. When the patient was admitted into the hospital, fourteen months after the accident, sensation was natural but paralysis of motion still existed. The thermometer gave the temperature of the upper extremity 99 3-4 deg. F., while that of the lower extremity was only 78 deg. F., making a difference of 21 3-4 deg. F. between the two extremities. There was an ulcer on the left heel (caused by a nail) at the time of the accident, which had never got well. When the temperature was raised by artificial means, the ulcer slowly healed under appropriate treatment. This case is interesting, both in showing the very unusual loss of heat in the paralyzed parts, and the effect upon the reparative power of the limb. In a case, under the care of M. Hutchinson, (*b*) of fracture at fourth dorsal vertebra, the temperature taken the day after the injury was 101 deg. at the ankles and 104 deg. at the pelvis. Under the service of Mr. Erichsen a man was admitted into University College Hospital, with fracture at sixth cervical from a fall. The thermometer indicated a temperature of 98.6 deg. a few hours after receipt of injury. The following day epileptiform convulsions ensued, the mercury rose to 106.8 deg. and 109 deg. when he died. The autopsy showed the cord, at a point corresponding to fracture, "swollen, pinkish and softened."

In a case of acute softening of spinal cord, treated in St. Bartholomew's Hospital, in which the paralysis of the lower extremities was complete as to motion, partial as to sensation, the temperature in the earlier stages ranged from 100.4 deg. to 104.8 deg. in axilla, and from 100.3 deg. to 105.4 deg. at

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(*a*) Medical Mirror, March, 1869.
(*b*) Lancet, May, 1869.

perineum. The temperature fell as the case progressed, with the perineum constantly indicating from 1 deg. to 2 deg. higher than the axilla. It was only 96 deg. in axilla and 97.6 deg. at perineum when death occurred (*a*). Ollivier (*b*) gives the history of a man in whom, after a fall upon his back, there was "anæsthesia of right side and retained paralysis of motion of the left side. The temperature, taken three months after the accident, was 3 1-2 deg. higher on the left than on the right side.

Earle (*c*) reports a case of complete paralysis of left arm following fracture of the clavicle, in which the temperature in left axilla was 4 deg. lower than on normal side. "In a case reported by Waters, a man was struck on right side of head by a capstan-bar. The next day there was numbness of right side of face and right arm and leg. A partial loss of power was observed in these parts and the right side was of a higher temperature than left. The autopsy showed a clot of blood lying on right side of posterior aspect of medulla oblongata, and two lacerations, one of which divided the right restiform body completely * * : and a second, situated to the right of rib of calamus scriptorius, dividing posterior pyramid and tract outside of it."(*d*) Dr. Webber cites a case of paralysis of right side, in which the temperature of the paralyzed side was 5 per cent. higher than on healthy side. The autopsy disclosed a clot of blood in internal half of left crus cerebri. (*e*)

A man admitted into hospital ship "Dreadnought," suffered from paralysis of motion in lower limbs, dating back to an injury received some time previously. A few weeks after admission he had several "fits," resulting in hemiphlegia of right side. The thermometer stood on right side 98.2 deg.—left side 97.3 deg. During the progress of the disease the

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(*a*) Lancet, November, 1869.
(*b*) Romberg; Diseases of Nervous System, vol. 1, p. 201.
(*c*) Ibid, page 202.
(*d*) Med. Chir. Trans. Trans. XLVI, page 115. Quoted by Edes, loc. cit. page 97.
(*e*) Ibid.

paralyzed side generally registered about a degree higher than the normal side. Autopsy revealed both lateral ventricles dilated: A "patch of softening which passed directly from without the left corpus striatum to the gray matter at surface." Marked softening of the spinal cord was also found at a point corresponding to third dorsal vertebra.(*a*)

A man, aged 33, was admitted into University College Hospital, under the care of Dr. Hare, suffering from hemiplegia of right side. Five days previously he had an attack, from which he perfectly recovered in a day or two. The right side of the face was flushed and covered with large drops of perspiration; the right sides of chest and abdomen also presented the same inequality of moisture, though in a less degree than the face. The temperature in right axilla, 100 deg.; left axilla, 98.5 deg. The patient rapidly recovered, and in four weeks there was no appreciable difference in the moisture of the two sides, and the thermometer registered the same degree in both axillæ. Two months afterwards he had another attack which proved fatal in a few hours. The man had an aneurism of the arch of the aorta. The vessels on the surface were distended and the lateral ventricles contained a a large quantity of serous fluid. No minute examination of the brain was made.(*a*)

An interesting case of alternate right and left unilateral convulsions and hemiplegia is reported by Dr. Alexander Robertson.(*b*) Unfortunately we have but a meagre thermometrical report. A man, aged 43, suffered from necrosis of the skull—the result of a fall received fourteen months previously. Some time afterwards he was seized with convulsions, confined at first to the left side, but gradually became general. The left side was found to be paralyzed. He was trephined when consciousness returned. The affected side gradually regained its power. Later, convulsions again began, confined at first to the right, but gradually involving the left side, when

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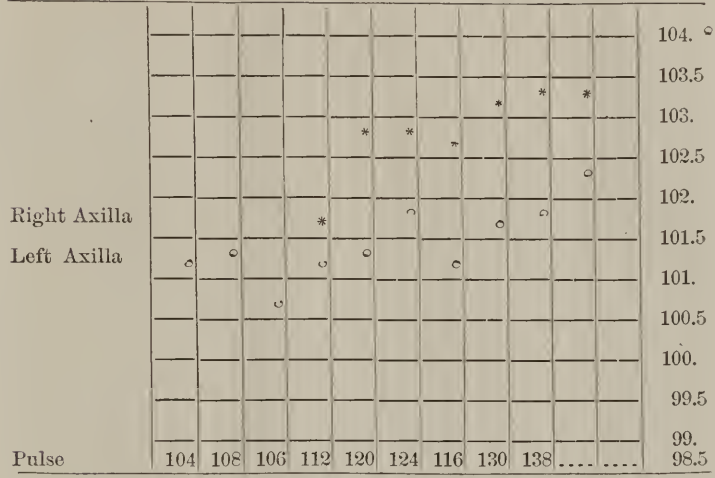
(*a*) British Med. Journal. Quoted in Hammond's Journal for Jan., 1869.
(*b*) Edinburgh Journal, Dec., 1869.

right hemiplegia was found to exist. A hernia formed at the point trephined and the brain substance freely sloughed. The temperature taken in right axilla was 100.8 deg.; left, 100.2 deg. The autopsy showed a "deep cavity in parietal lobe, capable of holding about three ounces of fluid." In the right hemisphere, on the "posterio parietal lobule there was a superficial, softened and eroded spot about the size of a shilling."

The following case occurred recently in the Southern Ohio Lunatic Asylum: A woman, aged 68, in ordinary health, complained of pain along the spine and upper part of neck. The pain increased in severity, until the least movement caused her intense suffering. She passed large quantities of urine and sweated profusely. A few hours afterwards she sank into a comatose condition, which lasted for twenty hours, when she gradually regained consciousness and for several days her mental operations seemed as active as usual. The severity of the pain had passed away but still any attempt at moving her caused her to cry out. The urine still continued largely in excess of the usual amount and the sweating profuse. The thermometer indicated a temperature ranging from 100.4 deg. to 101.8 deg. in the morning and from 100.7 deg. to 102.3 deg. in the evening. Pulse ranging from 94 to 128 beats per minute. Subsequently she again relapsed into a comatose condition, with the mercury standing at 100.8 deg. Before consciousness had fully returned, paralysis of the right side was suspected, which suspicion was immediately verified by the thermometer; it affording, in the difference of temperature between the two sides, the first reliable indication of the lesion. At first, the difference in heat was only 3-10 deg., which gradually increased as the paralysis became marked, the average difference being about

1 deg. The progress of the case is shown in the diagram given below:



M. B., female, aged 43, was admitted into the asylum after the second apoplectic seizure, with complete paralysis of left side. There is but little difference in the development of the opposite limbs. Five months after the paralysis occurred the following ranges of temperature were taken:

	Morning average.	Evening average.
Sound side	98.25 deg.	98.30 deg.
Paralyzed side	98.40 deg.	99.90 deg.

Showing an increase of heat on diseased side over both the morning and evening ranges of the healthy side—the evening giving the greatest difference. Both sides also show an increase of the evening over the morning temperatures; the larger difference being found on the paralyzed side. Another interesting fact observed is, that in the first series of observations, began immediately after her admission, the rule was to find a slight fall in temperature from morning to evening on the healthy side, while the diseased side presented a slight rise of the evening over the morning temperature. The case, though still under observation, is slowly improving, and

its improvement is marked by the nearer approach of the temperature of the paralyzed limbs to the normal standard.

M. G., a male, aged 54, admitted with hemiplegia of right side. Paralysis of one year's duration. Right limbs decidedly atrophied.

	Morning average.	Evening average.
Healthy side	99.37 deg.	99.07 deg.
Paralyzed side	98.23 deg.	98.20 deg.

This case presents quite a thermometrical contrast with the previous one. 1st. The temperature of the healthy side is considerably increased, while that of the paralyzed side seems about normal. He is subject to rheumatism, and at the time the observations were made was threatened with an attack, which may probably be the explanation of the increased temperature of the non-paralyzed limbs. 2d. There is a fall from morning to evening on both sides, more marked on the paralyzed side.

T. S. suffered from an apoplectic seizure in May, 1869, resulting in hemiplegia of the right side. The thermometer, for the first few days succeeding the attack, ranged from 99 deg. to 102 deg. The paralyzed side was constantly from 3-10 to 1 deg. hotter than the opposite side. The paralysis gradually improved; the temperature also fell until the thermometric equilibrium was restored.

Charcot (*a*) has shown that in apoplexy the result of either cerebral hemorrhage or softening, if it be of a fatal character, the temperature will present three periods.

1st. A lowering of the degree during the first few hours.

2d. An oscillation between the normal temperature and 100 deg., which may last a variable number of days.

3d. A rapid rise to 105 deg. or more, which foretells death.

The cases given in the preceding pages are found to be confirmatory of the views of Eulenberg and Landois, who consider the temperature of paralyzed parts to go through two stages, in the first of which it is increased and in the second decreased.

(*a*) Quoted in Dublin Quarterly, November, 1869.

M. Folet (*a*) concludes, as the result of his observations, "In the great majority of cases hemiplegia is accompanied from its commencement by an elevation of the temperature of the paralyzed part: calorific equilibrium persists very rarely and diminution of temperature is rarely ever met with.

"The period of duration of the elevation varies extremely in different cases. Whilst in certain patients, especially in those who have not been attacked suddenly with hemiplegia, it may not continue longer than two months, it may in other individuals persist for many years.

"Well marked paralytic atrophy is accompanied by a variable depression of the temperature."

The following table of cases observed at the Bicetre and quoted by Dr. Edes, gives the condition in old cases, of the affected side compared with the temperature of the sound limb:

1—3 years	Little or no atrophy	+ 0.8
2—1 year	No atrophy	+ 0.6
3—20 months	Slight deltoid atrophy	
4—4 years	Atrophy slightly advanced	—
5—6 years	" " "	—
6—Old	" " "	— 0.2
7—8 years	Atrophy	— 0.2
8—7 months	Slight atrophy	— 0.6
9—18 months	Atrophy	— 0.6
10—7 years	"	— 0.8

The following table gives the condition in five cases observed in the asylum:

1—1 year	Atrophy well marked	— 1.12
2—1 year	No atrophy	— 0.3
3—3 years	No atrophy	— 0.2
4—6 months	No atrophy	+ 0.4
5—2 days	No atrophy	+ 1.0

In 39 cases of hemiplegia examined by Dr. Robertson, (*b*) the temperature in 22 cases was less on the paralyzed side than the healthy—the degree varying from 1-5 to 1 3-5 deg. Nine were equal, and in eight cases the paralyzed side showed an increase of heat. There is no reference to the length of time the paralysis has continued, hence we are unable to institute a comparison.

(*a*) Gazette Heb. No. 12, 1867. Quoted in Half Yearly abstract, 1867.
(*b*) Edinburgh Journal, December, 1869.

The rule is to find a primary increase of heat due to paresis of the vaso-motor nerves, causing an increased amount of blood to circulate in the capillaries of the heart. Healthy nutrition is dependent upon other causes than the mere presence of blood, and the withdrawal of the ordinary nerve stimulus ultimately interferes with assimilation, and atrophy results. At this period the thermometer indicates a diminution of heat even below the normal standard. In those cases of persistent hemiplegia, in which nutrition does not seem materially impaired, there is at some time in the history a restoration of the thermometric equilibrium.

It is not improbable that the heat of the lesion causing the paralysis may influence the amount of difference between the opposite sides.

Brown-Sequard (*a*) gives, as the result of his observations, the following variations of temperature as most frequently occurring in the lesions set opposite; involving, of course, only a lateral half of the cerebro-spinal axis.

1st. In lesions of the brain proper, optic thalamus or corpus striatum the temperature is normal on the same side, and increased on the opposite side.

2d. When the lesion is seated in the pons varolii, in the medulla oblongata either above or at the level of the decussation of the anterior pyramids and in the spinal cord, the temperature is increased on the same side and diminished on the opposite side.

I have tabulated below the thermometrical ranges of 90 cases of insanity occurring in females. The observations were made with an Aitkin's self-registering thermometer.

Two observations were made daily; in the morning, between the hours of eight and ten o'clock; in the evening, between the hours of three and five.

The instrument was retained in the axilla six minutes. In each case the temperature was taken for several successive

(*a*) Loc. Cit., page 203.

days, and the averages thus obtained were used to compute the averages for the different forms of disease.

Form of Disease.	No. of cases.	Morning.	Evening.	Mean.	Excess in morning.	Excess in evening.
Mania, Acute	15	98.70°	98.90°	98.80°	.....	.20
Mania, Chronic	15	98.53	98.34	98.49	.19	.....
Melancholia	16	98.01	98.14	98.08	.....	.13
Dementia	11	98.19	98.53	98.36	.....	.34
Puerperal Insanity.	12	98.65	98.84	98.75	.....	.19
Phthisical "	8	99.25	100.00	99.63	.....	.75
Epileptic "	13	98.70	98.89	98.80	.....	.19
Normal temperature		98.36	98.25	98.31	.11	.....

In comparing the averages as given in the above table, it will be noticed that, excluding phthisical and epileptic insanity, the different types do not present any marked difference in their thermometrical ranges. This similarity is not what we would at first thought expect to find, though the explanation is apparent. Insanity is not an entity; but is a diseased mental condition, probably always dependent on a morbid physical state. Dr. Gundry (*a*) writes: "In a large proportion of cases the health had been impaired shortly before, or at the time when insanity was first observed. It may be considered perhaps as an exaggeration to say that the failure to discover this in every case may possibly be due more to the imperfection of our methods and means of observation than to its absence, yet it cannot be gainsaid that with greater care the evidence of physical disease immediately previous to or accompanying the attack might be detected in a much larger proportion of cases than it now appears." Dr. Gray (*b*) says: "Insanity is a pathologic state of the physical man, whether discovered or not. The person may have no special or well-marked disease, but is in general ill health, is run down in tone and reaching a certain point the brain gives way and he is insane." Maudsley holds: "In reality every moral cause operates through the physical changes which it produces, and in the great majority of cases in which the cause has

(*a*) Eighth Annual Rep. of S. O. L. Asylum.
(*b*) Report of N. Y. State Asylum.

been pronounced moral, there has been something in the physical constitution by the co-operation of which the result has been brought about." Insanity, then, in a medical point of view, is but the mental expression of physical diseases acting on the brain. While not unfrequently the particular physical lesion may give type or character to the mental phenomena, yet as any lesion may be causative of any one of the three grand divisions of mental disease—mania, melancholia and dementia—we should expect the thermometrical reading, in any special case, to vary with the lesion causing it.

The foregoing remarks apply with greater force to the time at which the insanity manifests itself. For it must be remembered that, although incurable physical lesions generally beget incurable mental troubles, it is not essential to the continuance of the insanity that the bodily lesion should be persistent; and it not unfrequently happens that curable diseases beget incurable insanity. When the pathological habit has once replaced the normal physiological habit, it tends to reproduce itself, and the mental disorder continues after the cause has been removed. At any rate, in many of the cases, even at the time of their admission into the asylum, the causative bodily lesion had disappeared, and consequently could not affect the thermometry of the cases.

Mania.—In Acute Mania we find the morning average to be 98.70 deg. and the evening 98.90 deg., showing an increase over the normal temperature both in the morning and evening. The evening average exceeds that of the morning by .2 degrees.

The majority of the cases figuring in the above average were typical ones, the patients refusing food, tearing their clothes and bed-clothing, sleeping but little, and had to be confined to secure the observation.

The fact that the thermometer marks so slight an increase over the normal temperature proves that the expenditure of vital power is less than the condition of the patient would indicate. We are thus enabled to better understand those cases in which the period of excitement extends over months, and the physical condition continues to improve. The tempera-

ture varies with the condition of the patient at the time the observation is made. In an interval of quiescence the temperature is lower than during the period of excitement. When, as not unfrequently happens, the vital powers succumb to the prolonged excitement, the thermometer very accurately points out the danger and oftentimes furnishes the earliest indication. In a case which proceeded to a fatal termination from exhaustion, while the patient was apparently in no way different from her condition for the previous three weeks—very noisy and destroying everything within her reach—the thermometer registered a temperature of 101 and 102 deg., and in three days she died.

Dr. Fox (*a*) holds the following language: "As the excitement tells upon the strength the mercury generally falls; and if a patient dies in a maniacal attack, the temperature will be one of collapse, falling even 4 or 5 deg. below the normal." The case first alluded to, together with several others which have come under my notice, compels me to doubt the accuracy of Dr. Fox's statement. Invariably in the exhaustion which follows an attack of mania, I have found the temperature materially increased, ranging from 98.9 to 100 degrees.

Chronic Mania, including cases from 1 year to 20 years, gave 98.53 deg. as the morning average and 98.34 deg. in the evening. When the force of the disease is expended, and the patient has settled down into the regular habits of asylum life, the temperature is lower than in the acute form. The diurnal variations more nearly approach those of the healthy adult. Although the patient is in a constant state of exalta tion, the pathological habit has been thoroughly established, the system has become tolerant, and the heat is but little above that of health. In no form of insanity have I found so great individual differences of heat as in Chronic Mania, ranging all the way from 97.5 to 99.5 deg. In three cases of over ten years duration the mercury never stands lower than 98.5 deg. and almost constantly over 99 deg.; yet there is no proof of any special disease to account for the unusual

(*a*) Med. Times and Gazette, May, 1870.

altitude. The same individuals, also, oftentimes present considerable differences in temperature. This is well marked in circular insanity, and especially in that form in which the periods of quiescence may last for months. Dr. Clousten found a difference of 2.2 deg. computing the averages in four cases. The greatest average difference I have recorded is 1.5 deg. This case always presents quite decided increase in her periods of excitement from which she emerges greatly emaciated and exhausted.

Melancholia.—The averages in sixteen Melancholic patients gives 98.01 deg. for the morning and 98.14 deg. for the evening temperature in this form of disease. This is a decided diminution when compared with the results obtained either in health or the other forms of mental disease. The evening temperature, however, is higher than the morning. The lowest average obtained in any individual case was 96.23 deg. and the highest was 99.00 deg.

Melancholia is characterized by the sluggish condition of all the organs; the skin loses its freshness and becomes harsh and dry; the pulse is slow, and the respiration is often drawn with the sigh. Most generally the digestive organs sympathize with the general depression. With a poor appetite aided by a worse digestion the powers of life are brought below the normal standard. In looking over my observations I find the lowest averages to be cases of melancholia, and occurring in that form of the disease in which there is persistent refusal of food. In several cases of dementia, in which the patients took no nourishment excepting as the nurses put it in their mouths, the thermometer registered an unusual elevation of temperature. In these cases the refusal of food seemed to arise from a want of sufficient intelligence to appreciate and satisfy the wants of nature; but in the cases above alluded to, refusal seemed to arise from a feeling of unworthiness on the part of the patient—she had been so wicked the Lord did not wish her to eat. In one case the patient said she had two mouths and the food always got in the wrong one.

The cases of dementia examined gave the morning average

98.19 deg. and 98.53 in the evening. Thus dementia, the natural sequence of all forms of mental degeneration, in which the afflicted sit vegetating all day long, and oftentimes in their helplessness require the same care as infants, has a mean temperature higher than in melancholia; and the evening rise is even in excess of that in chronic mania.

The great difference between the morning and evening altitudes—.34 deg.—indicates progressive disease and points out the death rate in the class. I am well aware that the temperature above given is higher than that obtained by other observers. One, in passing through the wards and observing the dementia, with congested extremities, blank expressionless face, the remnant of former mental fire, apparently just flickering in the socket preparatory to its final going out, would hardly expect to find the temperature so high. However the patients, upon whom the observations entering into the above average were made, are as strongly marked cases of the class as any in the asylum. All those complicated with epilepsy, and those in whom we had good reasons to suspect the deposit of tubercle were excluded. There are, however, two facts to be borne in mind. 1st. That the demented, excluding acute dementia, are often pretty well advanced in years. 2d. The condition of system produced by or at least accompanying dementia, is precisely that most prone to latent phthisis. In a table prepared by Dr. Clousten for another purpose, I find that in 282 deaths from phthisis in the Royal Edinburgh Asylum 153 occurred in the demented. While in 181 deaths from other than tubercular disease only 49 were cases of dementia. Thus it will be seen that dementia is credited with nearly one half of the tubercular cases and with only a little more than one-fourth of the deaths from other causes. Most authors now recognize a peculiar form of disease having much in common with dementia, under the name of phthisical insanity. In one of the cases taken in the above average, in whom there can be no question as to her mental condition being that of dementia,

and one too of several years' duration, the average morning temperature was 98.27 deg. and the evening 99.30 deg., giving an increase in the evening altitude of 1.03 deg., without any apparent cause for the high temperature. The thermometrical reading would point to tubercular deposit, but there is, as yet, nothing to confirm it. Maudley says, "the recurring attacks of excitement in some cases of dementia, when there appears to be a slow softening of the brain advancing by periodical starts, the temperature will rise several degrees during the exacerbation, sinking afterwards to its natural standard."

Puerperal Insanity.—The insanity caused by child-bearing and lactation always gave a high temperature. The average was 98 65 deg. in the morning and 98.84 deg. in the evening. In every puerperal case thermometrized, with a single exception, there was an increase of the evening over the morning temperature; the excess varying from one-tenth of a degree to one and one-tenth degrees. The lowest mean temperature was 98.26 deg.—the highest 99.27 deg.

In a paper read before the Obstetrical Society of London on "Puerperal Temperatures," Mr. Squire gives the following as the result of his investigations: In the latter months of pregnancy the temperature of the body is somewhat increased and after the sixth month generally exceeds 99 deg. The commotion and efforts of parturition while confined within the limits of natural labor cause but little elevation in the temperature. In his cases the highest reading was 99.9 deg.—the lowest series in any case had only a range of 98.9 to 99.1 deg. In a majority of cases the temperature rose after delivery and stood about 99 deg. The elevation thus occasioned immediately after delivery invariably experienced a continuous decline and often even descended below the normal line. Another rise ushers in the secretion of milk and subsides with its establishment.

In reviewing my observations and comparing them with the temperatures obtained by Mr. Squire, I find that the temperature in puerperal insanity differs but little from the

temperature during the latter months of pregnancy and for a variable period succeeding delivery.

The cases are brought to the asylum at a variable period succeeding confinement and consequently I have been unable to secure a connected thermometrical history beginning prior to the insanity and extending through the attack to health. One case, in whom the insanity was doubtless dependent upon pregnancy, gave birth to a fœtus advanced to about the seventh month, which from several circumstances seemed to be the result of self-produced abortion. The thermal range taken about one month previous to the occurrence was 98.6 deg. In six hours afterwards the mercury stood at 98.9 deg., and gradually fell to 98.65 deg. The third morning the thermometer read 98.85 deg., and on examining the breasts a few drops of milk were found. The secretion of milk was very slight, and on the sixth day the mercury only reached 98.4 deg., about which it has since ranged.

Phthisical Insanity.—In this form of mental disease the thermometer is most valuable to the asylum physician. Those symptoms, cough and expectoration, which to the world at large tell unmistakably of the deposit of tubercle in the lungs, are often absent during the entire course of the disease in the insane. Even the results of physical exploration upon which the expert so confidently makes his diagnosis, are very often most unsatisfactory among the insane.

Not unfrequently patients are brought to the asylum worn out and exhausted by protracted refusal of food and sleeplessness, in whom neither the friends nor the examining physician through the absence of the well known symptoms suspected lung trouble, but who are already far advanced in phthisis. The thermometer, however, almost always tells the fatal story in the high temperature which it persistently records. The averages as given in the table are higher than for any other form of insanity. The excess of the evening over the morning temperature—5-10 of a degree—is also greater. In a very large majority of cases the temperature is high whether the tuberculization is active or not. It is

highly probable that in some instances the nervous system may, in some of its protean manifestations, so mask the temperature as to prevent the variations peculiar to consumption. Oftentimes there seems to be a sort of metastasis between insanity and phthisis; so that phthisis occurring in an insane person relieves the mental symptoms for the time being, and not unfrequently an attack of insanity in a person already tuberculous arrests temporarily the tuberculization; in these cases the thermometer shows only a slight increase above normal.

Several cases recently admitted into the asylum with an antecedent history of lung trouble far advanced, as given both by the attending physician and family—patients much emaciated and physical examination affording confirmatory evidence, the temperature range is extremely low, varying from 96 to 98.9 deg. I have no means, of course, of ascertaining what the heat measured before the development of the mental disturbance, but inasmuch as the patients are increasing in flesh and gaining in health, contrary to the previous history, it seems probable that the attack of insanity has arrested the development of tubercle, and interfered in some way with the calorific function.

The following case has interest in this connection. M. B., aged 30, insane for two years. The greater portion of the last fifteen months of her life, during which time she was under observation, her general health steadily failed. She became very much emaciated, although having a ravenous appetite. There was no cough or expectoration. The thermometer never registered higher than 97.4 deg., even when retained in the axilla for twenty minutes, and on many occasions did not exceed 95.2 deg. The average of all observations made is 96.26 deg. for the morning, and 96.63 deg. for the evening; showing an increase of four-tenths in the evening heat. The thermometer twenty minutes before death only registered 95.8 deg.

On opening the chest the lungs were found deeply congested, the right rather more than the left. The whole sub-

stance was thickly studded with tubercles. Numerous small vomicæ were found scattered in every portion of the lungs. The apices were almost totally destroyed by cavities. Small black spots were scattered both on the surface and in the substance of the lung, some seemed to be a mere staining of the tissue, while others were solid and cut as if it were a deposit of some kind. Unfortunately the brain was not examined.

Epileptic Insanity.—In epileptic insanity the temperature is high. The range for the morning is 98.70 deg. and for the evening is 98.89 deg. Marked differences in temperature occur in epileptics, both when the same individual is examined at different times and in persons whose condition, mentally or physically, is apparently the same. In two demented epileptics, having many points in common, but differing in physique and duration of mental disease, one presented an average temperature of 99.09 deg. in the morning and an evening average of 88.9 deg.; the second had a range of 97.42 deg. in the morning and 97.8 in the evening.

The above comparisons were made at a time when they had both been free from their fits for three weeks. When the latter had a fit about every twelve hours for several successive days the temperature ran up to 98.6 deg. in the morning and 99 deg. in the evening, presenting an increase of one and two-tenth degrees. This leads us to speak of the effect the fit itself exerts upon the temperature. It is difficult to obtain observations just before the fit begins and I have only been fortunate enough to secure three such observations. In every instance there was a slight fall in the thermometer of from one to three-tenths. In one case the thermometer stood at 97.8 deg. immediately preceding the convulsion, and at 98.6 during the sleep which followed it. The average in this case was ascertained to be 98.9 deg. Repeated observations on different persons show a lowering of temperature immediately after the fit, ranging one degree to one tenth of a degree. In a short time the temperature begins to rise, and in from 8 to ten hours has attained the usual altitude.

A case, whose fits had ceased for some weeks, re-appeared in a succession of fifty or more, the fits occurring with great regularity about every ten minutes. Towards the middle of the series the thermometer registered 102.4 deg. between the fits and gradually ran up to 103 deg. when the convulsive movements began. Three hours after the fits ceased the mercury stood at 101.4 deg. twelve hours after at 100 deg., and for the three succeeding days had a morning altitude of 99.6 deg. Her daily average taken from observations made at times when she was free from fits is 98.96 deg. in the morning and in the evening 99.50. Several times in using the thermometer after she had suffered from a single fit I found a depression of temperature which gradually increased, returning to the ordinary temperature in about twelve hours. From the history of the above case, which agrees with my observation in others, it will be noticed that a single fit depresses the temperature, while a number of fits increases it for the time.

I am inclined to think, from my experience in the use of the thermometer, that those cases of epilepsy in which the fits are often replaced by explosions of anger so characteristic of the disease, have ordinarily a higher temperature than simple epilepsy.

REPORT

ON THE

TEMPERATURE OF CERTAIN

NERVOUS DISEASES:

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OF DAYTON, OHIO.